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ABSTRACT

This study compared the academic performance, intellectual capacity, listening ability, and study skills of students who participated in programs designed to develop specific learning skills with students who did not participate in the programs with regard to total group, level of intellect, sex, and grade level. Two hundred and ten students, enrolled in the Learning Development Program (LDP) and 210 students enrolled in the Listening Skills Program (LSP) composed the experimental group while 210 students in the same school served as a control group. Participants in each of the three groups were one section of each grade level K-6. All participants were administered pre- and posttests to determine their performance in mathematics, reading, listening skills, general intelligence, and work study skills. The grade level of each student was determined, and students were placed in the primary (K-3) or elementary (4-6) groups. Further data were collected from measurement tests. Results indicated that students in experimental groups tended to improve their performance in each category to a significantly greater extent than students in the control group. Primary students benefitted most in development of mathematics skills; elementary students seemed to improve listening and work study skills to a greater degree than primary students. There was little difference in the performance of boys and girls. (MJM)

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A STUDY OF THE INFLUENCE OF A LEARNING DEVELOPMENT PROGRAM ON THE COGNITIVE GROWTH AND LEARNING SKILLS OF ELEMENTARY STUDENTS

A Study Conducted By

Dr. Hester C. Motley

August, 1972

Sponsored by:

Virginia Commonwealth University,

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And

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Richmond, Virginia

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Division of Educational Research and Statistics

PILOT STUDY SECOND-YEAR REPORT

School Division CHESTERFIELD COUNTY Date August 15, 1972

Title of Study THE INFLUENCE OF A LEARNING DEVELOPMENT PROGRAM ON THE COGNITIVE GROWTH AND LEARNING SKILLS OF ELEMENTARY STUDENTS

Name and title of local person responsible for supervision of this study MR. THOMAS FULGHUM--DIRECTOR OF RESEARCH

THE PROBLEM

What is the effect of a program designed to teach learning skills for students from the kindergarden to the sixth grade ? Can a program be developed that will enable teachers to teach students listening and work study skills ? To what extent can students increase their listening and work-study skills ? How do students who participate in the learning development program differ from those who do not participate in the program ? How does such a program affect the academic performance of students? Which students benefit most from the program with regard to grade level, sex, and level of intellect ?

1. Statement of the Problem

The purpose of this study was to compare the academic performance, intellectual capacity, listening ability, and study skills development of students who participated in programs designed to develop specific learning skills with students who did not participate in the programs with regard to: (1) the total

group, (2) level of intellect, (3) sex, and (4) grade level for randomly selected students. This study was conducted in one elementary school in Chesterfield County.

The first year of the study was devoted to developing the materials that were used in the program, orienting teachers to the use of these materials, randomly assigning teachers and students into groups, and pretesting the students.

In-service training for teachers was conducted so that teachers could become acquainted with the program and its objectives. Teachers were also given an opportunity to share in the planning of the program and the development of the materials.

The materials that were used consisted of tapes, movies, records, books, professional kits devised for the development of listening and work-study skills, and a list of activities developed by the researchers and the assistants. Each grade-level teacher was given a list of objectives and the materials she needed to carry out these objectives. The objectives were discussed at a number of in-service training periods. Consultants from the firm which published the professional kits instructed the teachers in the use of this material. Professors from Virginia Commonwealth University talked to the teachers concerning creative ways the material could be used. The librarian instructed the experimental groups in work-shops designed to increase their work-study skills.

The entire school population was pre-tested to determine their level of functioning at the beginning of the program.

The following tests were administered: The Otis-Lennon Mental Ability Tests, The Durrell Listening and Reading Tests, The SRA Work-Study Skills Test, and The Stanford Achievement Math Tests.

The final meeting of the year was used by teachers for a critical evaluation of the program with suggestions for ways to improve the program for the following year.

a. Review of the Literature. The idea of teaching students how to learn is not new. Alfred Binet emphasized the importance of discrimination, observation, persistance, retention, and adaptability to new situations and new requirements. He proposed that all these functions are susceptable to development through education.[1] Other psychologists, agreeing in the main with Binet, have stressed adjustment to life and the capacity to learn "as essential ingredients in intellectual development."[2] Otto and Koenke say that"a basic assumption in remedial education is that lack of learning skills is not a permanent decrement but a disability that can be overcome."[3] Paul Torrance and his associates have demonstrated that learning in creative ways can be "facilitated by deliberate methods and selected sequences of guided experiences."[4]

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[1]Alfred Binet, Les Ideas Modernes Sur Les Enfants (Paris: E. Flamarion, 1909).

[2]Henry Garrett, Testing for Teachers (New York: American Book Company, 1965), p. 47.

[3]Wayne Otto and Karl Koenke, Remedial Teaching (New York: Houghton Mifflin Company, 1969), p. 28.

[4]Paul Torrance, "Uniqueness and Creativeness: The School's Role," Educational Leadership, (March, 1967), p. 28.

Crow and Crow believe that learning competence cannot be achieved without the application of energy to learning material or situations. They contend that study is essential to learning and that acquiring knowledge, perfecting skills, and developing attitudes constitute the main purposes of learning. These authors state that some learners may be able to develop good study proceedures without assistance while "others need careful and continued guidance."[5]

b. Justification. The vague and undefined nature of the world of tomorrow, the expanding and exploding body of knowledge, the changing vocational skills needed in a technological society, and the psychological damage to students unable to learn create the need to investigate every avenue for providing learning skills that will prepare students to continue to learn. The Learning Development Program (LDP) and the Listening Skills Program (LSP) may not be limited to the students in this study; they may be extended to the teaching of basic learning skills at all grade levels in order to increase cognitive growth in the educational experiences of all students.

2. Objectives

a. To determine the effects of a daily Learning Development Program on the students' achievement in reading, Durrell Reading Tests (DURRELL-R), mathematical ability, The Stanford Achievement Tests (SAT), general intelligence, Otis-Lennon Ability Test (OTIS),

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[5]Lester Crow and Alice Crow, Human Development and Learning (New York: American Book Company, 1956), p. 251.

listening skills, Durrell Listening Test (DURRELL-L), and work-study skills, Science Research Associates Test (SRA), of the students.

b. To determine the effects of a daily Listening Skills Program on the students' achievement in reading (DURRELL-R), mathematical ability (SAT), general intelligence (OTIS), listening skills (DURRELL-L), and work-study skills (SRA) of the students.

c. To compare the effectiveness of the two programs outlined above with each other and with a control group that receives no special training in the development of learning skills with regard to student achievement in reading ability, mathematical ability, general intelligence, listening skills, and work-study skills.

d. To determine which students benefit most from these two programs with regard to grade level, sex, and level of intelligence.

3. Hypotheses

The following hypotheses were designed in order to determine the significant relationships among students in the LDP, LSP, and control groups in their performance in mathematics, reading, general intelligence, listening skills, and work-study skills and to compare these relationships with regard to the level of the total group, intellect, sex, and grade level. The hypotheses are stated in the null form to permit statistical treatment and to enable the researcher to reject or confirm the null hypotheses. The null hypotheses, which follow, will be rejected on a basis of a criterion probability of .05 or less.

a. There is no significant difference ($p \leq .05$) in the increase of reading achievement, arithmetic achievement, listening

skills, work-study skills, and intellectual capacity between the total group of students who participated in the Learning Development Program (LDP), those in the Listening Skills Program (LSP), and those students who did not participate in either program.

b. There is no significant difference ($p<.05$) in the increase of reading achievement, math achievement, listening skills, work-study skills, and intellectual capacity between the above-average and the below-average students who participated in the Learning Development Program, those students in the Learning Skills Program, and those in the Control Group.

c. There is no significant difference ($p<.05$) in the increase of reading achievement, math achievement, listening skills, work-study skills, and intellectual capacity between the males and females in the LDP, those in LSP, and those students in the Control Group.

d. There is no significant difference ($p<.05$) in the increase in the reading achievement, math ability, listening skills, work-study skills, and intellectual capacity between the primary and elementary students in the LDP, those in LSP, and those students in the Control Group.

4. Educational Implications

The explosion of knowledge and the rapidly changing vocational opportunities in the technological society demand that each individual be a more efficient and effective learner. When students know how to learn, they can acquire the necessary information more readily, they enjoy learning more, they develop better self-concepts because cognitive development is inseparable from personal develop-

ment, and students do not have to confront as many problems associated with failure. The Coleman Report shows that beginning pupil deficiencies are cumulative; i.e., students who start behind, usually stay behind. The need to begin early programs aimed at developing better learners seems mandatory.

5. Design

a. Sample. The experimental population consisted of 210 students (1 section of each grade level K-6) enrolled in LDP and 210 Students (1 section of each grade level K-6) enrolled in LSP. The experimental groups were compared to 210 students (1 section of each grade level K-6) in a control group at the same school.

b. Exact Method of Selecting Sample. The students were placed in groups according to a table of random numbers. The assignment of each group to the experimental or control situation was determined by random selection. Teachers were assigned randomly to the various groups.

c. Variables. The independent variable for Experimental Group I consisted of a Learning Development Program designed to emphasize the stated objectives of the non-graded program in Chesterfield County with emphasis on work-study skills. The independent variable for Experimental Group II consisted of a Listening Skills Program, planned to implement the non-graded program in Chesterfield County. Teachers in the experimental group received in-service training in which the primary focus was on the development of skills necessary to intellectual growth.

Specifically, the in-service program consisted of training teachers to utilize methods, materials, and concepts which should

encourage students to use their mental facilities in a more efficient manner.

The dependent variables consisted of the students' increases in performance in math, reading, listening, work-study skills and all intellectual ability.

6. Procedures

a. Data Collected. All of the children in the student body at the elementary school were tested twice to determine their performance in mathematics, reading, listening skills, general intelligence, and work-study skills. The pre-tests were administered in January, 1971; and the past-tests were administered in April, 1972.

The grade level of each student was determined, and the students were placed in two groups (the Primary Group consisted of grades K-3, and the Elementary Group consisted of grades 4-6).

The initial scores on the Otis-Lennon Mental Ability Tests were used to divide the students into two groups according to intellectual ability. Those students with percentile scores of 50 and above were placed in the above-average group, while those students with percentile scores of 49 and below were placed in the below-average group.

b. Measuring Instruments. The Stanford Achievement Tests were used to measure arithmetic achievement. The SRA Work-Study Skills Tests were used to measure work-study skills. The Durrell Listening and Reading Tests were used to measure listening and reading ability. The Otis Lennon Mental Ability Tests were used to measure general intelligence.

7. Statistical Procedures

The mean scores of each test for each group was determined. The significance of differences between means was assessed for each group by independent-group T-tests in order to accept or reject the null hypotheses. The null hypotheses were rejected on the basis of a criterion probability of .05 or less.

8. Results of the Study

Inasmuch as a year and three months of intensive instruction had intervened between the pretests and posttests, progress was expected to be realized. The differences between the groups should have been significant statistically.

Some consideration should be given to the fact that many of the activities in the two experimental groups were based on concepts that improve the students' ability to follow directions, to concentrate, and to persist at a task. Since these abilities are necessary in order to perform well on a test, it is possible that the test scores were affected by the experimental program; i.e., the experimental students may have been more test wise.

In any experimental situation, it is necessary to consider the Hawthorne Effect. The fact that a student was participating in an experimental group might have tended to improve his performance on the tests.

The results of the study are recorded in Tables I through IV. Table I shows the effects of the Learning Development Program and the Listening Skills Program on the students' achievement in arithmetic, reading, listening, work-study skills, and general intelligence for the total group of students. See Table I, Page 10.

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TABLE I

COMPARISON OF THE MEAN INCREASES OF THE TOTAL CONTROL AND THE TOTAL EXPERIMENTAL GROUPS WITH REGARD TO ARITHMETIC, READING, LISTENING, WORK-STUDY AND INTELLECTUAL CAPACITY

Comparison Groups	Math SAT	Reading Durrell-L	Listening Durrell-R	Work-Study SRA	Intelligence Otis
Control with LSP	.002 **	.001**	.001**	.032*	.003**
LSP with LDP	.279	.541	.002**	.036*	.589
Control with LDP	.001**	.021*	.004**	.001**	.001**

The information in Table I shows the comparison of the mean increase in math, reading, listening, work-study skills, and general intelligence between the students in the Learning Development Program and those students in the control group. The LDP Students' gain in arithmetic, listening, work-study skills, and general intelligence was significant at .01 level of probability. There was less gain in the reading ability of the LDP Students, but the comparison shows the difference to be significant ($p. < .05$).

The hypothesis that there is no significant difference ($p. < .05$) in the increase of reading achievement, arithmetic achievement, listening skills, work-study skills, and intellectual capacity between the total group of students in the Learning Development Program and those students who did not participate in either program was rejected.

Inspection of Table I reveals the comparison of the mean increases in math, reading, listening skills, work-study skills, and general intelligence between the LSP Students and the LDP Students. There was no significant difference in the increase in math, reading, and intellectual ability between the LSP and the LDP Students. The LSP Students gained significantly ($p. < .01$) in listening ability when compared to the LDP Students. The LDP Group significantly increased their work-study skills ($p. < .05$) when compared to the LSP Group. The hypothesis that there was no **significant difference** in the listening and work-study abilities of the LSP and LDP Groups was rejected.

Table I also shows the comparison of the mean increases in math, reading, listening, work-study, and general intelligence between the LSP and the Control Group. There was a significant difference ($p. < .01$) in the math, reading, listening, and general ability between the Control and LSP Groups, showing a significant gain in the LSP Group. The LSP Group had a significant increase ($p. < .05$) in their work-study skills when compared to the Control Group. It was necessary to reject the hypothesis that there is no significant difference in the increase in math, reading, listening, work-study, and general intelligence between the LSP and Control Groups.

Table II (p. 13) shows the comparison of the mean increases between the above-average students and the below-average students in their math, reading, listening, work-study, and intellectual capacity. When the above-average students were compared to the below-average students in the LSP Group, it was found that there was no significant difference in the increase of math, reading, listening, work-study, and intellectual ability of the LSP Group. The greatest gain was made by the below-average group in their work-study skills. The hypothesis that there was no significant difference in the increase of the math, reading, listening, work-study, and intellectual ability between the above-average and below-average students in the LSP was accepted.

The information in Table II reveals that the increase in performance of the above-average and below-average students in the LDP Group was not significantly different in their math, reading, listening, work-study, and intellectual ability. The

TABLE II

COMPARISON OF THE MEAN INCREASES OF THE ABOVE-AVERAGE STUDENTS AND BELOW-AVERAGE STUDENTS WITH REGARD TO ARITHMETIC, READING, LISTENING, WORK-STUDY AND INTELLECTUAL CAPACITY

Comparison Groups	Math SAT	Reading Durrell-L	Listening Durrell-R	Work-Study SRA	Intelligence Otis
LSP with LSP	.134	.161	.822	.072	.932
LDP with LDP	.291	.290	.838	.240	.139
Control with Control	.359	.014*	.361	.003**	.238

* $p < .05$

** $p < .01$

greatest gain was made in listening skills by the below-average group.

The hypothesis that there was no significant difference ($p. < .05$) in the math, reading, listening, work-study, and intellectual capacity of the above-average and below-average in the LDP Group was accepted.

Table II shows a comparison of the mean increases of the above-average and below-average students in the Control Group. There was a significant difference ($p. < .01$) in the work-study skills of the above-average and below-average students. The below-average students increased their work-study skills to a much greater degree than the above-average students in the Control Group. The above-average students in the Control Group had a significant increase over the below-average students in reading ability. The hypothesis that there was no significant difference in the increase of ability in math, listening, and intelligence between the above-average and below-average students in the Control Group was accepted. The hypothesis that there was no difference ($p. < .05$) in the reading and work-study skills between the above-average and below-average students in the Control Group was rejected.

Inspection of Table III (p. 15) shows that the hypothesis that there was no significant difference ($p. < .05$) in the increase of math, reading, listening, work-study, and general intelligence between the females and males of the LDP, LSP, and Control Groups must be accepted. Further examination of the data reveals that boys in the Listening Group had a greater gain in math and reading ability, although not significantly so.

TABLE III

COMPARISON OF THE MEAN INCREASES OF BOYS AND GIRLS WITH REGARD TO ARITHMETIC, READING, LISTENING, WORK-STUDY AND INTELLECTUAL CAPACITY

Comparison Groups	Math SAT	Reading Durrell-L	Listening Durrell-R	Work-Study SRA	Intelligence Otis
LSP with LSP	.795	.353	.875	.599	.780
LDP with LDP	.296	.218	.633	.906	.790
Control with Control	.992	.390	.485	.547	.683

The information in Table IV reveals that there was a significant difference in the increase of math and listening achievement for the primary and elementary students in the LSP Group. The primary students increased their math ability at a significant level ($p. < .05$) when compared to the elementary students. The elementary students increased their listening skills at a significant level ($p. < .01$) when compared to the primary students in the LSP Group. The hypothesis that there is no significant difference in the increase in math and listening ability for primary and elementary students in the LSP Group was rejected. The hypothesis that there was no difference in the increase of reading, work-study, and intelligence between primary and elementary students in the LSP Group was accepted. See Table IV, Page 17.

Table IV shows the comparison between the primary and elementary students in the LDP Group. The hypothesis that there is no significant difference ($p. < .05$) between the primary and elementary students (LDP Group) in the increase of reading and intellectual capacity was accepted. The hypothesis that there was no significant difference ($p. < .05$) between the primary and elementary students (LDP Group) in the increase of math, listening, and work-study skills was rejected. Examination of mean scores reveals that the primary-grade students in the LDP Group increased their math ability significantly more than the elementary students. The elementary students increased their listening and work-study skills at a significant level ($p. < .01$) when compared to the primary students in the LDP Group.

TABLE IV

COMPARISON OF THE MEAN INCREASES OF PRIMARY AND ELEMENTARY CHILDREN WITH REGARD TO ARITHMETIC, READING, LISTENING, WORK-STUDY, AND INTELLECTUAL CAPACITY

Comparison Groups	Math SAT	Reading Durrell-L	Listening Durrell-R	Work-Study SRA	Intelligence Otis
LSP with LSP	.028*	.294	.006**	.230	.127
LDP with LDP	.029*	.905	.007**	.005**	.085
Control with Control	.003**	.089	.360	.154	.616

* $p < .05$

** $p < .01$

The hypothesis that there was no significant difference ($p. < .01$) in the increase of math achievement between the primary and elementary students in the Control Group was accepted. The data show that the elementary students had less increase in math than the primary students in the Control Group.

The hypothesis that there was no significant difference ($p. < .05$) in the reading, listening, work-study, and intellectual capacity between the primary students and elementary students (Control Group) was accepted.

Conclusions

The purpose of this study was to compare the academic performance, intellectual capacity, listening ability, and study skills of students who participated in experimental activities with the students in a control group and to determine which students tended to benefit most from the experimental program.

The data show that the students in the experimental groups (LSP and LDP) tended to improve in their reading, math, listening, and work-study skills, and intellectual capacity to a significantly greater extent than the students in the Control Group. Some of this improvement can be attributed to the nature of the experimental activities; but the evidence is clear that such a program tends to increase the test performance of students who engage in activities geared to the development of listening and work-study skills.

The students who benefitted most in the development of mathematical skills are the primary students. The elementary students seem to improve their listening and work-study skills to a greater degree than primary students. There is little difference in the performance of boys and girls in the Experimental and Control

Groups, indicating that they profit equally from the program.

The below-average students increased their work-study skills to a greater degree than the above-average students, while the above-average increased their reading skills significantly more than the below-average students. The program was equally beneficial for the above-average and below-average in their performance on math, listening, and intellectual tests.

The Learning Development Program and Listening Skills Program have decidedly influenced the cognitive growth and learning skills of elementary students with some groups gaining more than others from the experience.